**UNIT -5**

**Structured Analysis**

Structured Analysis is a development method that allows the analyst to understand the system and its activities in a logical way.

It is a systematic approach, which uses graphical tools that analyze and refine the objectives of an existing system and develop a new system specification which can be easily understandable by user.

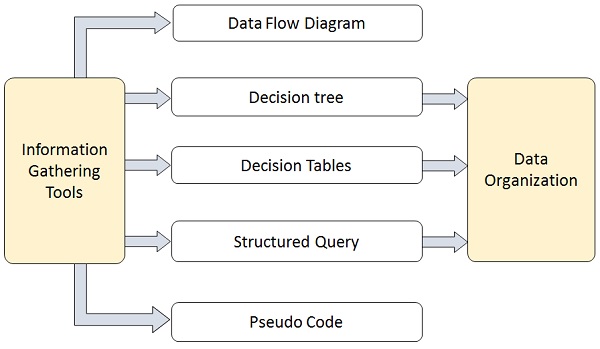
It has following attributes −

* It is graphic which specifies the presentation of application.
* It divides the processes so that it gives a clear picture of system flow.
* It is logical rather than physical i.e., the elements of system do not depend on vendor or hardware.
* It is an approach that works from high-level overviews to lower-level details.

**Structured Analysis Tools**

During Structured Analysis, various tools and techniques are used for system development. They are −

* Data Flow Diagrams
* Data Dictionary
* Decision Trees
* Decision Tables
* Structured English



**Data Flow Diagrams (DFD) or Bubble Chart**

It is a technique developed by Larry Constantine to express the requirements of system in a graphical form.

* It shows the flow of data between various functions of system and specifies how the current system is implemented.
* It is an initial stage of design phase that functionally divides the requirement specifications down to the lowest level of detail.
* Its graphical nature makes it a good communication tool between user and analyst or analyst and system designer.
* It gives an overview of what data a system processes, what transformations are performed, what data are stored, what results are produced and where they flow.

**Basic Elements of DFD**

DFD is easy to understand and quite effective when the required design is not clear and the user wants a notational language for communication. However, it requires a large number of iterations for obtaining the most accurate and complete solution.

The following table shows the symbols used in designing a DFD and their significance −

|  |  |  |
| --- | --- | --- |
| **Symbol Name** | **Symbol** | **Meaning** |
| Square | Square | Source or Destination of Data |
| Arrow | Arrow | Data flow |
| Circle | Circle | Process transforming data flow |
| Open Rectangle | Rectangle | Data Store |

**Types of DFD**

DFDs are of two types: Physical DFD and Logical DFD. The following table lists the points that differentiate a physical DFD from a logical DFD.

|  |  |
| --- | --- |
| **Physical DFD** | **Logical DFD** |
| It is implementation dependent. It shows which functions are performed. | It is implementation independent. It focuses only on the flow of data between processes. |
| It provides low level details of hardware, software, files, and people. | It explains events of systems and data required by each event. |
| It depicts how the current system operates and how a system will be implemented. | It shows how business operates; not how the system can be implemented. |

**Data Dictionary**

A data dictionary is a structured repository of data elements in the system. It stores the descriptions of all DFD data elements that is, details and definitions of data flows, data stores, data stored in data stores, and the processes.

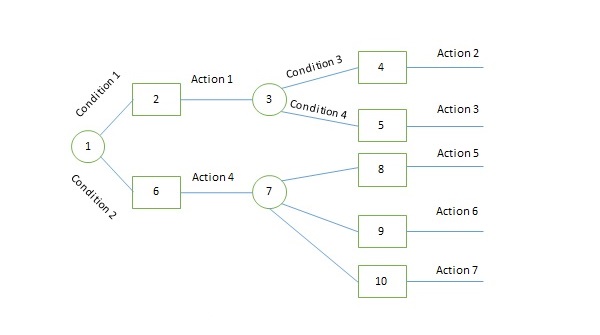
A data dictionary improves the communication between the analyst and the user. It plays an important role in building a database. Most DBMSs have a data dictionary as a standard feature. For example, refer the following table −

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.No.** | **Data Name** | **Description** | **No. of Characters** |
| 1 | ISBN | ISBN Number | 10 |
| 2 | TITLE | Title | 60 |
| 3 | SUB | Book Subjects | 80 |
| 4 | ANAME | Author Name | 15 |

**Decision Trees**

Decision trees are a method for defining complex relationships by describing decisions and avoiding the problems in communication. A decision tree is a diagram that shows alternative actions and conditions within horizontal tree framework. Thus, it depicts which conditions to consider first, second, and so on.

Decision trees depict the relationship of each condition and their permissible actions. A square node indicates an action and a circle indicates a condition. It forces analysts to consider the sequence of decisions and identifies the actual decision that must be made.



The major limitation of a decision tree is that it lacks information in its format to describe what other combinations of conditions you can take for testing. It is a single representation of the relationships between conditions and actions.

For example, refer the following decision tree −

**Decision Tables**

Decision tables are a method of describing the complex logical relationship in a precise manner which is easily understandable.

* It is useful in situations where the resulting actions depend on the occurrence of one or several combinations of independent conditions.
* It is a matrix containing row or columns for defining a problem and the actions.

Components of a Decision Table

* **Condition Stub** − It is in the upper left quadrant which lists all the condition to be checked.
* **Action Stub** − It is in the lower left quadrant which outlines all the action to be carried out to meet such condition.
* **Condition Entry** − It is in upper right quadrant which provides answers to questions asked in condition stub quadrant.
* **Action Entry** − It is in lower right quadrant which indicates the appropriate action resulting from the answers to the conditions in the condition entry quadrant.

The entries in decision table are given by Decision Rules which define the relationships between combinations of conditions and courses of action. In rules section,

* Y shows the existence of a condition.
* N represents the condition, which is not satisfied.
* A blank - against action states it is to be ignored.
* X (or a check mark will do) against action states it is to be carried out.

For example, refer the following table −

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONDITIONS** | **Rule 1** | **Rule 2** | **Rule 3** | **Rule 4** |
| Advance payment made | Y | N | N | N |
| Purchase amount = Rs 10,000/- | - | Y | Y | N |
| Regular Customer | - | Y | N | - |
| **ACTIONS** |  |  |  |  |
| Give 5% discount | X | X | - | - |
| Give no discount | - | - | X | X |

**Structured English**

Structure English is derived from structured programming language which gives more understandable and precise description of process. It is based on procedural logic that uses construction and imperative sentences designed to perform operation for action.

* It is best used when sequences and loops in a program must be considered and the problem needs sequences of actions with decisions.
* It does not have strict syntax rule. It expresses all logic in terms of sequential decision structures and iterations.

For example, see the following sequence of actions −

if customer pays advance

then

Give 5% Discount

else

if purchase amount >=10,000

then

if the customer is a regular customer

then Give 5% Discount

else No Discount

end if

else No Discount

end if

end if

**Guidelines for Selecting Appropriate Tools**

Use the following guidelines for selecting the most appropriate tool that would suit your requirements −

* Use DFD at high or low level analysis for providing good system documentations.
* Use data dictionary to simplify the structure for meeting the data requirement of the system.
* Use structured English if there are many loops and actions are complex.
* Use decision tables when there are a large number of conditions to check and logic is complex.
* Use decision trees when sequencing of conditions is important and if there are few conditions to be tested.

**Feasibility study:**

* To determine what the candidate system is to do by defining its expected performance.
* Thus a feasibility study is carried out to select the best system that meets performance requirements.

**Types of Feasibility Study**

* Economic Feasibility
* Technical Feasibility
* Behavioral Feasibility

**Economic Feasibility**

It i Also known as cost benefit analysis.

* To determine the benefits and savings that are expected from a candidate system and compare them with costs.
* If Benefits outweigh Costs, then the decision is made to Design and Implement the system.

**Technical Feasibility**

* It checks whether the existing computer system supports the candidate system or not or up to what extent it supports.
* It basically centers around Hardware, Software etc.

For e.g. Current Computer is operating at 77 % capacity and running another application can Overload the system so need new system.

**Behavioural Feasibility**

* An estimate should be made of how strong a reaction the user staff is likely to have towards the development of a computerized system.
* It is common knowledge that computer installation have something to do with Turnover, Transfers and changes in employee Job Status.

For e.g.SBI Bank.

**Steps in Feasibility Analysis**

1. Form a project team and appoint a project leader
2. Prepare system flowcharts
3. Enumerate potential candidate systems
4. Describe and identify characteristics of candidate systems
5. Determine and evaluate performance and cost effectiveness of each candidate system
6. Weight system performance and cost data
7. Select the best candidate system
8. Prepare and report final project directive to management

**Input Design**

In an information system, input is the raw data that is processed to produce output. During the input design, the developers must consider the input devices such as PC, MICR, OMR, etc.

Therefore, the quality of system input determines the quality of system output. Welldesigned input forms and screens have following properties −

* It should serve specific purpose effectively such as storing, recording, and retrieving the information.
* It ensures proper completion with accuracy.
* It should be easy to fill and straightforward.
* It should focus on user’s attention, consistency, and simplicity.
* All these objectives are obtained using the knowledge of basic design principles regarding −
  + What are the inputs needed for the system?
  + How end users respond to different elements of forms and screens.

Objectives for Input Design

The objectives of input design are −

* To design data entry and input procedures
* To reduce input volume
* To design source documents for data capture or devise other data capture methods
* To design input data records, data entry screens, user interface screens, etc.
* To use validation checks and develop effective input controls.

**Data Input Methods**

It is important to design appropriate data input methods to prevent errors while entering data. These methods depend on whether the data is entered by customers in forms manually and later entered by data entry operators, or data is directly entered by users on the PCs.

A system should prevent user from making mistakes by −

* Clear form design by leaving enough space for writing legibly.
* Clear instructions to fill form.
* Clear form design.
* Reducing key strokes.
* Immediate error feedback.

Some of the popular data input methods are −

* Batch input method (Offline data input method)
* Online data input method
* Computer readable forms
* Interactive data input

**Input Integrity Controls**

Input integrity controls include a number of methods to eliminate common input errors by end-users. They also include checks on the value of individual fields; both for format and the completeness of all inputs.

Audit trails for data entry and other system operations are created using transaction logs which gives a record of all changes introduced in the database to provide security and means of recovery in case of any failure.

**Output Design**

The design of output is the most important task of any system. During output design, developers identify the type of outputs needed, and consider the necessary output controls and prototype report layouts.

Objectives of Output Design

The objectives of input design are −

* To develop output design that serves the intended purpose and eliminates the production of unwanted output.
* To develop the output design that meets the end users requirements.
* To deliver the appropriate quantity of output.
* To form the output in appropriate format and direct it to the right person.
* To make the output available on time for making good decisions.

Let us now go through various types of outputs −

**External Outputs**

Manufacturers create and design external outputs for printers. External outputs enable the system to leave the trigger actions on the part of their recipients or confirm actions to their recipients.

Some of the external outputs are designed as turnaround outputs, which are implemented as a form and re-enter the system as an input.

**Internal outputs**

Internal outputs are present inside the system, and used by end-users and managers. They support the management in decision making and reporting.

There are three types of reports produced by management information −

* **Detailed Reports** − They contain present information which has almost no filtering or restriction generated to assist management planning and control.
* **Summary Reports** − They contain trends and potential problems which are categorized and summarized that are generated for managers who do not want details.
* **Exception Reports** − They contain exceptions, filtered data to some condition or standard before presenting it to the manager, as information.

**Output Integrity Controls**

Output integrity controls include routing codes to identify the receiving system, and verification messages to confirm successful receipt of messages that are handled by network protocol.

Printed or screen-format reports should include a date/time for report printing and the data. Multipage reports contain report title or description, and pagination. Pre-printed forms usually include a version number and effective date.

**Forms Design**

Both forms and reports are the product of input and output design and are business document consisting of specified data. The main difference is that forms provide fields for data input but reports are purely used for reading. For example, order forms, employment and credit application, etc.

* During form designing, the designers should know −
  + who will use them
  + where would they be delivered
  + the purpose of the form or report
* During form design, automated design tools enhance the developer’s ability to prototype forms and reports and present them to end users for evaluation.

**Objectives of Good Form Design**

A good form design is necessary to ensure the following −

* To keep the screen simple by giving proper sequence, information, and clear captions.
* To meet the intended purpose by using appropriate forms.
* To ensure the completion of form with accuracy.
* To keep the forms attractive by using icons, inverse video, or blinking cursors etc.
* To facilitate navigation.

**Types of Forms**

**Flat Forms**

* It is a single copy form prepared manually or by a machine and printed on a paper. For additional copies of the original, carbon papers are inserted between copies.
* It is a simplest and inexpensive form to design, print, and reproduce, which uses less volume.

**Unit Set/Snap out Forms**

* These are papers with one-time carbons interleaved into unit sets for either handwritten or machine use.
* Carbons may be either blue or black, standard grade medium intensity. Generally, blue carbons are best for handwritten forms while black carbons are best for machine use.

**Continuous strip/Fanfold Forms**

* These are multiple unit forms joined in a continuous strip with perforations between each pair of forms.
* It is a less expensive method for large volume use.

**No Carbon Required (NCR) Paper**

* They use carbonless papers which have two chemical coatings (capsules), one on the face and the other on the back of a sheet of paper.
* When pressure is applied, the two capsules interact and create an image.

**Documentation**

**Project Documentation**

The purpose of project documentation describes the project as a whole. The project documentation gives executives, managers and employees a broad view of the project's proposed methods, resources and objectives. The project proposal documents show executives the goals and budget of the project. The technical specifications outline the hardware and software requirements for the projects. The project plan details the steps the programmers, technicians and designers will take to achieve the project's objectives.

**Test Documentation**

Test documents illustrate the plans for testing the product before its release. The quality assurance department develops testing plans for both internal "alpha" users and external "beta" testers. The test documentation includes testing instructions -- such as a specific set of steps testers must follow -- to determine if the product is functioning as planned. QA staffers also collect issue logs, bug lists and reports from testers.

**Team Documentation**

The exchange of ideas among team members is vital to the success of a project. Team documentation records these exchanges for use on the current project and on future projects. Team plans, schedules and status updates are major components of team documentation. Checklists help project managers view which tasks the team has completed. The minutes of team meetings allow managers to track various issues, suggestions and assignments among team members.

**User Documentation**

The most critical element of system documentation is the content that reaches the customer. The user documentation must be free from overly technical jargon and contain clear, concise language. The user manual is typically the main component of the user documentation, but users also rely on other sources. Training resources -- including manuals and videos -- can help users quickly and easily understand how the system works. When the system does not perform as expected, a troubleshooting guide can help the user find and solve the problem.

**Disaster Management Planning**

No one is exempt from a disaster, and most organizations are unprepared if a [disaster](https://www.bizmanualz.com/security-planning-disaster-recovery) erupts, unless your company has prepared a Disaster Plan that accounts for any disaster that will exceed your ability to respond effectively: a worst-case scenario.

Disasters result from three (3) types of incidents, caused by:

1. Natural or cataclysmic events (i.e., hurricane, earthquake, fire, flood, storm);

2. Human behaviour (i.e., robbery, bomb threat, arson, hostage event, transportation strike); and

3. Technological breakdowns (i.e., power outage, computer crash, computer virus).

**Planning Your Disaster Plan**

The key to disaster management is to have a disaster plan in place before disaster strikes. Your disaster plan should include set of simple, effective disaster recovery guidelines and [disaster procedures](https://www.bizmanualz.com/disaster-recovery-policies-and-procedures-manual) for all people to follow. Just as a ship without a rudder is at the mercy of the tides, a company without a disaster plan is at the mercy of potentially tragic events.

After a review of [disaster responses](http://www.ndtv.com/article/india/what-not-to-do-in-a-terror-investigation-home-ministry-s-admissions-on-hyderabad-blasts-453750) following various disasters, U.S. regulators are now urging firms to [improve business continuity and disaster recovery plans](http://blogs.reuters.com/financial-regulatory-forum/2013/08/21/u-s-regulators-urge-firms-to-improve-business-continuity-and-disaster-recovery-plans/).

Human beings tend to make inappropriate decisions during a crisis. So, if your company has a plan already prepared for coping with most emergencies and you have shared the plan with your employees, then you stand a better chance of surviving an emergency and recovering rapidly.

**Disaster Management Preventive Action**

Your [disaster management planning](https://www.bizmanualz.com/disaster-recovery-action-plan) process should include preventative actions designed to accomplish a common goal — to prevent you from becoming a victim of a violent act, or at least to reduce the likelihood of serious injury. Your [Disaster Recovery Plan](https://www.bizmanualz.com/disaster-recovery-policies-and-procedures-manual) is a strategic planning, training and reference tool for helping you to decide what to do before, during and after a violent event. Tactics that work for one person may not work for another. The choices — and your success or failure — are all yours. You can, after all, do everything right and still lose, and everything wrong and still win.

You have more work to do if you are truly committed to developing a safe working environment for your company, including:

* Conducting a survey of your employees to help you determine if, in fact, you even have a potential problem. Your insurance company’s risk management department may provide the survey form — or even conduct the survey for you.
* Contacting your local, state and federal emergency and crisis management agencies, insurance providers and other community resources for more information. The agencies, providers and other service groups often offer literature, signage, training programs and counseling referrals that you can adapt to your workplace.
* Using a computer online service to locate and contact other resources, such as articles in periodicals, online focus groups and other similar companies that have experienced the same events that you are trying to prevent. You can benefit from other peoples’ mistakes.